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# NASA TECH BRIEF



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## Nonflammable Organic Adhesives Effective Over Wide Temperature Range

A series of highly fluorinated polyurethanes have been prepared as a basis for the development of nonflammable structural adhesives for use over a wide temperature range. The backbone of these polyurethanes is the polyether of perfluoropropylene oxide (PFPO). A typical member of this series of polyurethanes is prepared in a number of steps involving reaction between the hydroxyl-terminated polyether of PFPO and 1-chloro-3, 5, 6-trifluoro-m-phenylene diisocyanate. An adhesive system developed from the resultant polyurethane (isocyanate-terminated polyether of PFPO) exhibited adequate strength properties over the range of  $-320^{\circ}$  to  $+150^{\circ}\text{F}$  and was self-extinguishing in oxygen-rich atmospheres. Other derivatives of the basic fluorinated polyurethane employing specific curing and tackifying agents show promise for development into a broad range of nonflammable adhesives which will provide effective bonding of suitably prepared structural surfaces at temperatures extending from  $-320^{\circ}$  to  $+330^{\circ}\text{F}$ .

### Notes:

1. Owing to their excellent fire resistance and other unique properties, the fluorinated polyurethanes

should be evaluated for use as potting and encapsulating compounds, elastomers, coatings, films, and foams, as well as adhesives.

2. The following documentation may be obtained from:

Clearinghouse for Federal Scientific  
and Technical Information  
Springfield, Virginia 22151  
Single document price \$3.00  
(or microfiche \$0.65)

### Reference:

NASA-CR-102176(N70-18706), Development  
of Nonflammable Adhesives

### Patent status:

No patent action is contemplated by NASA.

Source: Al McLeod of  
Whittaker Corp.  
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